



# Australian Bureau of Statistics

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## **HISTORY OF ROADS IN AUSTRALIA**

Road travel plays a dominant role in life in Australia today even though it is continually being augmented by other means of travel and communication. Approximately 90 per cent of passenger travel and 20 per cent of freight transport is by road.<sup>2</sup>

By world standards Australia has an extensive network of roads (about 0.06 kilometres per capita in Australia compared with 0.03 kilometres per capita in both Canada and New Zealand) with a total of over 800,000 kilometres. These roads serve different functions ranging from major arterials (urban and rural) carrying heavy traffic movements, to property access roads (either residential streets or rural), the latter constituting about 85 per cent of the length of the national roadway. Almost three-quarters of the nation's road traffic (vehicle-kilometres) is carried on arterial and sub-arterial roads which together comprise only about 16 per cent of the total length of road.

Naturally enough, the development of this network reflects the response over many decades to a complex of economic, social, political and other considerations. As these demands have changed so has the concept of an acceptable road network altered. Cleared but generally undrained and unpaved tracks met the transport needs of the early settlers in New South Wales. Many kilometres of such rough bush tracks still survive (mainly in the inland areas), and about 80 per cent of the nation's road system is still unsealed, while over 50 per cent is natural earth-surface. However, most main roads have now been transformed into modern all weather roads suitable for fast and heavy motor vehicles.

### **The roads of the first settlers**

There was little planning in the development of the early roads. When a need arose a road was built, often following the trails or tracks produced by drays and bullock teams. Thus, the first road built in the colony was a cleared track from Dawes Battery to Governor Phillip's residence, a distance of nearly two kilometres. When the Parramatta district was settled a road was built to it from Sydney, branching off the road to Dawes Battery. In 1792, roads were built linking the new settlement in the Windsor district with both Sydney and Parramatta. Even in Sydney the street system was not regulated—the town plan produced by the Surveyor-General in 1788 was rejected as too grandiose and no further attempt to produce a town plan was made until Governor Macquarie arrived.

The condition of the roads and streets deteriorated rapidly. In overseas countries, road construction methods improved road quality considerably in this period, but the new colony was not able to take advantage of these improvements owing to a lack of trained surveyors and road and bridge engineers in the colony. (Until 1833, no one in the colony had been capable of designing and building a stone arch bridge.) Therefore, the easiest routes had to be adopted, and roads followed the tracks of the explorers, which were not necessarily the shortest routes. Apart from a lack of equipment and tools, the topography of the country was not conducive to easy road building. The convicts were a source of unlimited free labour but were an unwilling work force and needed constant supervision. Therefore, early roads were simply cleared tracks with no drainage and little grading or surfacing, thus needing regular reconstruction.

### **The influence of Macquarie**

A concerted attempt to improve the condition of the roads and to plan a road network was made by Governor Macquarie. When arrived in 1810, there were no paved roads outside Sydney and no real streets in the town. The roads within Sydney were only straggling paths: crooked, muddy, rutted and full of stumps. Houses encroached on the roads and animals rummaged in the rubbish thrown onto them. However, Macquarie was determined to improve the condition of the roads. Within several months, toll roads from Sydney to the Hawkesbury River and to Parramatta had been opened and a plan 'for the ornament and regularity of the streets of Sydney' \* partly executed. Macquarie planned for roads and bridges to precede settlement to avoid repeating the haphazard development which had characterised earlier road building.

Finance for the road construction and maintenance program was provided from Government funds, public subscription or tolls. The right to collect tolls was let to private operators who were called upon to construct roads and maintain them for ten years. To ensure that the condition of the major roads in the colony did improve, the administration specified a standard of construction and maintenance which the operators of the toll roads had to meet. The system appears to have worked successfully on the main roads and a profit of \$930 was made in 1815 from the tolls on the Sydney to Parramatta road.

Road conditions had improved greatly during Macquarie's term as Governor and when he left in 1822 the colony had a network of three major roads, with the Great Western Road from Sydney across the Blue Mountains to Bathurst being the most important. Order had been brought to Sydney streets with the adoption of a town plan, and the streets had been paved, named and signposted. Macquarie had been responsible for establishing the conditions for the road network to develop in a planned way. However, his successors as Governor were less concerned about the development of the network and road conditions deteriorated.

The impetus given to the growth of the country by the opening up of the Bathurst plains and the establishment of new colonies imposed strains on the road programs of the various administrations. They were not able to adequately maintain the existing roads or to construct new roads fast enough to keep up with the spreading of settlements. The situation worsened with the development of an acute labour shortage. This arose because of the attraction of the newly-discovered gold fields for workers and a decline in the transportation of convicts. As a result, road conditions deteriorated badly at a time when the growth of the wool and wheat industries made the need for improved roads to the interior of great importance. This problem was accentuated in times of low prices for wheat and wool when transport costs were crucial.

The pattern of road building in the other colonies had followed that set in New South Wales. However, except for Tasmania, the other colonies did not have a substantial pool of cheap convict labour for road works. Thus, the level of development of the road network in these colonies was generally lower than that in New South Wales.

Although the capitals of each of the colonies had a town plan which determined the layout of the streets, the road network in country towns was generally planned by government surveyors as an adjunct to their work of dividing up the sheep properties. A legacy of that policy is the similarity of the design of many towns, as the methods adopted for each town were usually the same—a wide main street was surveyed with narrower roads at intervals running at right angles to the main street. For larger towns, other roads parallel to the main one were constructed, producing a grid pattern.

### **The establishment of road authorities**

Even before gold was found the road construction programs had suffered from a shortage of funds as they had to rely on government budgets, loans, tolls and public subscription. For this reason the years from the 1830s saw the establishment of authorities primarily responsible for roads. This problem was exacerbated by the discovery of gold, one consequence of which was the rapid increase in population in New South Wales and Victoria which necessitated a large scale attack on the road problem. Legislation in New South Wales in the 1830s and 1840s had established road trusts in Sydney and Newcastle and local government organisations in other areas, with the power to impose tolls and with responsibility to construct and maintain local roads. They could levy rates but had no power to borrow funds (except by mortgaging future tolls and rates). Similar administrative structures existed during this period in other colonies.

The first centralised control of road construction in Australia came in South Australia, where the Central Board of Main Roads was established in 1849. In Victoria, there was centralised control of construction and maintenance from 1853 to 1863, through the Central Roads Board. This board expanded the network of toll roads but demanded larger licence fees from the companies collecting the tolls. These fees were redistributed to district boards for construction of community roads. Much was accomplished by the Board in clearing and paving roads, constructing bridges and in the maintenance of Victorian roads. However, viewed overall, the technical and financial task of road construction and maintenance on a large scale was beyond the capacities of these colonial road trusts.

### **The influence of the railways**

Until the late 1860s, the effort directed at extending and upgrading the road network increased for several reasons. Roads catered for most travel and the road transport firm, Cobb & Co., was expanding and providing relatively cheap travel. Further, the easing of the gold rushes had lessened the demand for bullock teams, resulting in a fall in prices for this type of road transport.

The development of railways changed this situation. By 1880, most of the early difficulties suffered by the railways had been overcome and rail, faster and cheaper than road transport, became the dominant transport mode for the next fifty years. The first priority of transport authorities was to extend the rail network and then to provide low cost roads to link centres to the rail heads:

'the roads as main highways for traffic from Sydney have to a great extent been superseded by the railways, but for a large part of the Colony they are still the sole means of communication, and as feeders to the railway system they play a very important part'.<sup>4</sup>

With the dominance of travel by the railways, a relatively inflexible mode of transport, it had become necessary to plan the integration of the various modes. At this stage, however, the role of roads was seen as completely subservient to that of all rail transport, including trams in the

cities.

Unlike Europe, Australia did not have an extensive network of good roads in existence when railways were introduced and roads became of minor importance as routes for heavy transport. Furthermore, by 1879 tolls on main roads had been abolished in all colonies, funds for road maintenance were granted irregularly and the cost of road transport did not continue to fall as it had in the aftermath of the gold rushes. Hence, standards of roads declined and the dominance of the railways was reinforced. Most country roads became simply deep wheel tracks, the development of arterial roads where they would parallel rail lines was slowed and the maintenance of roads already in existence was largely neglected. When a rail bridge was constructed over the Hawkesbury in 1889, the ferry across the river was stopped, thus closing the coastal road from Sydney to Newcastle until the ferry was reopened in 1930. A road bridge was not built until 1945.

One aspect of the dominance of railways which did assist the road network at this time was the upsurge in bridge building which accompanied the development of rail. As well as rail bridges many road bridges were built. In 1866 an iron bridge was built to connect north and south Brisbane; in 1868 a bridge was built across the Murrumbidgee River at Gundagai; and the Murray River was bridged at Echuca on the New South Wales-Victoria border in 1878. The last-mentioned bridge was intended as a rail bridge but the local residents stormed it on the day of the official opening and forced it to be opened to all traffic. As timber-built bridges had been found to be more vulnerable to fire, flood and decay, the more important bridges during this time were of iron and were built high above the floodplain.

Streets within towns were improved as a result of the establishment of shire councils with responsibility for, among other things, the maintenance of local roads. Where control for both road works and railways had previously been centralised in one department the condition of the roads had generally declined at the expense of the railways. In 1907 shires in New South Wales started to receive regular grants from the State Government and they were also given more independence in levying rates. They were not responsible for the construction and maintenance of arterial roads and bridges, this being the responsibility of the State Government. However, this did not alter the fact that most road construction was initially the responsibility of the shire councils, whereas today, shire councils and the State governments share the responsibility of construction.

## **Technological advances**

Late in the 19th Century, road travel was still slow and the journey uncomfortable. Most roads outside country towns were still unsealed, as crushed metal (used in macadamisation)\* was costly. City dwellers, however, were more fortunate. New road construction methods had been developed and accepted. Much of the initial development of wood block pavements was carried out in Australia and in 1880 the first such pavement in Australia was laid as an experiment in King Street, Sydney. By the end of the decade numerous pavements of blackbutt, tallow wood or blue or red gum had been laid in Sydney and Melbourne. In Adelaide, tar macadam had been discovered by accident as a road pavement when a tar cart tipped over, spilling its load on the street.

By 1900 the technical problems of the time had largely been solved. Until motor vehicles imposed new demands on road surfaces, the roads which had been developed were satisfactory for the traffic carried. (Although motor vehicles appeared on the roads before the end of the century, they were of little influence until after World War I.) In country districts most roads were of earth or gravel with no foundation, with a macadamised pavement used only on heavily trafficked roads. In cities, suburban streets with light traffic were macadamised, while a Telford base with a water-bound macadam surface was used only on roads with heavier traffic and on

experimental and specialised types of pavement in areas with the heaviest traffic. In 1890, another improvement in road building was made with the successful use of asphalt as a surfacing material.

## **The advent of the motor vehicle**

The advent of the motor vehicle altered the state of balance in which the road network had existed with the other modes of travel and the land use patterns. One of the first consequences was the necessity for the administrative structures to be altered to serve the changed set of circumstances.

The establishment in Victoria of the Country Roads Board (C.R.B.) in 1913, was the beginning of the drive by State governments to centralise control of road construction and maintenance. The development of the motor vehicle was bringing more traffic and a different type of traffic to the roads, and the municipalities were unable to cope with this changed situation. A central authority was needed to co-ordinate expenditure and planning. The C.R.B. was established to designate main roads and to share with the municipalities the cost of maintaining and constructing these roads. Consequently, the proportional contribution of the municipalities has declined over the years. The power of the C.R.B. has increased with more types of road having been brought under its control. Developmental roads, isolated settlers' roads, State highways, tourist and forest roads and, in 1956, by-pass roads (or freeways) have also been designated and constructed, or funds for construction have been supplied to local road authorities, by the C.R.B.

Similar development has occurred in the other States. In Queensland, the Main Roads Commission (now the Main Roads Department) was established in 1920; in New South Wales, the Main Roads Board (now the Department of Main Roads) was established in 1925; and in Western Australia the Main Roads Board was established in 1926 and replaced by the Main Roads Department in 1930. The administrative machinery needed to cope with the wide use of cars had been established by the end of the 1920s; in every State there was a central main roads authority.

The dominance of railways in the late 19th century had largely eliminated the need for high standard arterial roads, but the existing roads, suitable for horses, became inadequate with increasing usage by motor vehicles. Gravel roads were often narrow, rough, ungraded and impassable by cars in the wet, while tyres of the early cars were generally comprised of solid rubber (with some steel rimmed tyres) which damaged the roadway if it was at all irregular. Furthermore, the grade, surface, alignment and sight distances provided by the existing roads were not adequate for the faster, more heavily loaded vehicles which made up an increasing portion of the traffic. Hence a greater degree of government initiative was needed. Although regular subsidies had been given to local authorities for some years, many councils lacked engineers so it became necessary for the road boards to establish basic standards of design, construction and maintenance. Before the advent of motor vehicles, roads had deteriorated only at a slow rate and maintenance generally involved routine filling of potholes and occasional reshaping of the roads. However, with motor vehicles becoming more widely used, much closer attention to pavement surface was needed and preventative maintenance developed.

One of the first tasks of the Main Roads Board in New South Wales was the construction of a coastal road between Newcastle and Sydney. The new road was opened in 1930 and reduced the distance from Sydney to Newcastle from 249 kilometres to 172 kilometres and the ferry across the Hawkesbury River at Peat's Crossing (which had been closed when the railway bridge was built in 1889) was reopened and operated until a road bridge was opened in 1945. A system of roads primarily to join the major cities was a little closer with the completion of this road.

The depression of the 1930s slowed the development of a higher standard road network.

Substantial road funds were, by this time, being collected by the States from registration of motor vehicles, so that when motor vehicle ownership fell during the depression (the number of cars registered fell between 1930 and 1932, not reaching the 1930 peak until 1935) revenue declined as a consequence, and expenditure on construction and maintenance (particularly on main roads) likewise decreased. Rural roads were less affected since some unemployment relief funds were used to finance work on subsidiary roads.

Despite the effect of the 1930 depression on road revenue, the 1920s and 1930s were a time of considerable technological innovation. Great advances were made in the construction of lightly trafficked roads and in surfacing technique during this period with the large scale development of bituminous pavements. Binding of local gravels with tar and bitumen produced a smooth surface for traffic, that was cheaper, safer for motorists and less dusty in use.

### **The effect of the 1939-45 War**

Strategic considerations of the 1939-45 War had a profound influence on the Australian road network. The development of a system of major arterial roads was hastened as arterial roads and bridges were strengthened to support heavy army traffic. For the defence of the northern part of the country, supply roads had to be built to established centres and new roads built to the airfields which were being built around the northern perimeter of the continent. In 1942, the Allied Works Council was formed to plan and supervise road development for the war effort. Army and civilian construction authorities shared the task of developing the road network. The main road authorities of New South Wales, Victoria and South Australia jointly undertook the reconstruction and sealing of the Stuart Highway in the Northern Territory, the main supply route running north from the railhead at Alice Springs to the railhead at Larrimah. Over 960 kilometres of road was converted from a rutted, dusty, often impassable dirt track to an all-weather sealed highway capable of withstanding heavy military traffic. This road (later extended to Darwin) followed the route of the overland telegraph line. The Stuart Highway, the Eyre Highway parallel to the transcontinental rail line, and a supply route to the Northern Territory from Queensland (linking Darwin and Brisbane) were the most important arterial roads constructed in this period.

However with the effort needed to rapidly improve the arterial road network, construction authorities did not have the resources to properly maintain other roads. Because of this, country roads deteriorated badly during the war, and in the **Commonwealth Aid Roads and Works Act 1947**, a specific grant for these roads was made in an attempt to overcome the backlog.

### **The post-war period**

The progress in development of roads in remote areas achieved during the war has been continued by the Australian and State governments. Thus, States have designated development and tourist roads and assisted in the construction of these, while the Australian Government has participated in beef road development since 1949 when a program of road improvements to facilitate cattle transport was begun in Queensland, Western Australia and the Northern Territory. Grants have also been given for maintenance of certain roads designated as 'strategic' e.g. the Eyre Highway in South and Western Australia and the Barkly Highway in Queensland. Additional assistance has been given to South Australia as a contribution towards the costs of completing the sealing of the Eyre Highway. Tasmania has also received a grant to finance the construction of roads in the Gordon River region of south-west Tasmania to assist the development of the hydro-electric system.

The postwar period has brought accelerated change to the road system. In the cities, one result of the dominance of train and tram transport systems in the late nineteenth and early twentieth centuries had been a 'radial' pattern of development, with settlement extending along the

transport arteries. The development of motor vehicles enabled this pattern to be altered. The effect of motor vehicles on the community has been much more widespread than merely its effect on the road system. The rapid growth of population and motor vehicle ownership, the physical expansion of the cities, and the highly mobile lifestyle of the residents, have resulted in rapidly expanding government road budgets to provide a network of arterial roads and suburban streets in urban areas.

Problems facing road authorities in this period included attempting to catch up with the backlog of road works from the war period, to cater for ever-growing numbers of vehicles, to link isolated settlements with all-weather roads and to provide higher standards of service for the increasingly heavily trafficked roads. In the rural areas considerable progress was made by both State and local road authorities in improving many kilometres of arterial roads, as well as pursuing policies of sealing farm-to-market roads. Nevertheless some anomalies arose in this period such as farm access or minor rural roads being sealed but connecting with major arterial roads whose surfaces were unpaved. Problems of this sort brought into prominence the whole question of allocation of resources to road development, priorities of road improvement and the financial arrangements for roadworks

## **Responsibility for roads**

Legal responsibility for roads in the Territories is borne by the Australian Government while in the States it is shared between the State road authorities, local governments and, in some cases other authorities established by the State Governments. Since the establishment of the State road authorities early this century, their responsibilities have widened considerably as more types of roads have been classified by the State governments as under their control.\* Now, in most States, they are responsible for roads classified as freeways, State highways, tourist roads, developmental roads, other roads which were constructed for State or national purposes and all roads in unincorporated areas. The local government authorities are responsible for all unclassified roads (i.e. those which are not classified as controlled by the State road authorities) except in areas where special authorities have been established by the State government with responsibility for, among other things, road care, control and management (e.g. the Melbourne and Metropolitan Board of Works had responsibility until June 1974 for those roads in Melbourne declared by the Governor-in-Council to be metropolitan roads and metropolitan main highways). The State road authorities provide substantial financial assistance to local government authorities towards the cost of construction and maintenance of unclassified roads.

Since the advent of the motor vehicle, the financing of road investment has been characterised by the increasing involvement of the Australian Government and by increases in the level of funds provided. Today, approximately an equal amount of finance is provided by each level of government - Federal, State and local. However, the distribution between construction and maintenance varies. It is estimated that, while the Australian Government provides little finance for maintenance, in 1971-72 it provided about 60 per cent of the finance for construction of arterial roads and about 45 per cent of total construction finance. The rest of the finance for arterial road construction was provided by State governments. The remaining 55 per cent of total construction finance not provided by the Australian Government, and most of the maintenance finance, is provided in approximately equal parts by State and local authorities.

By the **Public Works Act** 1922, the Australian Government distributed \$500,000 to the States on a population basis with a dollar-for-dollar matching condition. The money was to be spent on maintenance of roads outside city areas and all expenditure was to be approved by the Australian Government. Further grants were made from 1923 to 1931 for specific roads only, and subject to matching conditions. To raise funds to meet expenditure on roads the States attempted to place a tax on the use of petrol but the High Court ruled the tax to be an excise duty and

therefore invalid. The right of the Australian Government to impose conditions on grants was established when the High Court dismissed a challenge by the Victorian Government over the conditions imposed on the specific purpose grant in the **Federal Aid Roads Act 1926**.

Severe economic hardship caused by the depression, and the problem of increasing budget deficits, influenced the formulation of the **Federal Aid Roads Act 1931**. Matching conditions were no longer applied and purposes for which the grants could be used were less rigidly defined. Matching conditions were not reintroduced until the **Commonwealth Aid Roads Act 1959** when a dollar-for-dollar matching condition was applied to part of the grant. In this period from 1931 to 1959, Australian Government grants rose substantially owing to increases in the proportions of petrol duties earmarked for roads, rising fuel consumption and supplementary grants made to the States. Grants to the States had fallen during the 1939-45 War because of the Government restriction on petrol consumption, but subsequently the amount rose with each successive piece of legislation.

Under the **Commonwealth Aid Roads Act 1959**, the Australian Government's contributions increased substantially, matching conditions were reintroduced for the additional grants, and the relationship between the grant and fuel tax revenues was deleted. For the first time, the States were permitted to use a portion of the grant for planning and research relating to construction, maintenance and repair of roads. The **Commonwealth Aid Roads Act 1964**, was similar to the 1959 Act. The total grant was increased by 50 per cent and the provision for expenditure on planning and research was extended. In 1964, the Australian Government constituted the Commonwealth Bureau of Roads (C.B.R.) to advise it on the appropriate size and distribution of the grants by the Australian Local Government to the States for roads and road transport.

In the light of Commonwealth Bureau of Roads recommendations, the **Commonwealth Aid Roads Act 1969** provided for \$1,252 million to be distributed to the States over the five year period 1969-70 to 1973-74. This was composed of a principal grant of \$1,200 million, conditional upon each State meeting a 'quota' of expenditure on roads from its own sources, and a supplementary grant of \$52.05 million payable to South Australia, Western Australia and Tasmania, on which no conditions were imposed. These supplementary grants were to be phased out by the end of the period specified in the Act. Four categories of road expenditure on which the grants could be spent were designated. The inclusion of two categories, expenditure on urban arterial and sub-arterial roads and on rural arterial roads, was a new development intended to establish a high standard arterial road system. The other two categories were expenditure on other rural roads and on planning and research. Planning and research was defined to include investigation into road transport in relation to other means of transport, research into road safety, the design of vehicles and the behaviour of road users - all areas of increasing importance with the rapid growth of road traffic and the resulting undesirable effects. As mentioned above, the Australian Government has also provided grants for beef roads, the Eyre and Barkly Highways and the Gordon River Road.

## Conclusion

### The present

While roads have many functions, an overall pattern of use has emerged so that it is possible to categorise the Australian road system in accordance with a hierarchical classification based on predominant function.

In 1971 and 1972 the Australian Roads Survey 1969-74 was conducted jointly by the Commonwealth Bureau of Roads and the National Association of Australian State Road Authorities. The survey covered all roads open to the public in Australia. To classify roads by function, nine functional classes were used, five covering rural roads and four covering urban



roads. The final results of the survey included an inventory of the Australian roads system containing information on the physical conditions and traffic characteristics.

### LENGTHS OF ROADS OPEN TO THE PUBLIC: AUSTRALIA, JUNE 1972 (Kilometres)

Road Type	Functional class of road (a)									Total Proportion	
	Rural								Urban		
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9		
Sealed pavement-Dual carriageway	182	113	130	254	-	1,131	190	14	-	2,014	0.2
Single carriageway	17,057	21,285	40,684	75,594	1,197	3,858	6,598	38,230	195	204,699	24.9
Total sealed	17,239	21,398	40,815	75,848	1,197	4,989	6,788	38,244	195	206,714	25.1
Unsealed pavement	1,123	1,640	12,128	177,966	1,109	5	452	7,762	24	202,209	24.6
Formed earth	3,228	1,622	11,832	191,689	655	-	31	2,363	-	211,421	25.7
Natural surface	1,009	74	2,451	194,504	1,057	8	18	2,155	-	210,276	24.5
<b>Total</b>	<b>22,600</b>	<b>24,734</b>	<b>67,225</b>	<b>640,007</b>	<b>4,018</b>	<b>5,002</b>	<b>7,289</b>	<b>50,524</b>	<b>220</b>	<b>821,620</b>	<b>100</b>
Proportion (percent)	2.8	3.0	8.2	77.9	0.5	0.6	0.9	6.1	-	100	-

(a) The nine functional classes used in the survey are:

#### Rural roads

Class 1—For movement of people and goods between the major cities and regions

Class 2—For movements between major cities and towns and between the towns

Class 3—For movements between important centres and between centres and towns and as feeder roads to the class 1 and 2 roads

Class 4—For provision of road access to properties and houses

Class 5—For provision for one particular activity or function in rural areas

NOTE. Classes 1, 2 and 3 roads comprise rural arterial roads, class 6 roads are urban arterial roads and class 7 roads are also known as urban sub-arterial roads.

#### Urban roads

Class 6—For large volume movement of people and goods.

Class 7—For large volume movement of traffic for distribution to the local street systems and to supplement the class 6 roads.

Class 8—For provision of road access to abutting properties.

Class 9—For provision for one particular activity or function in urban areas.

There are now over 800,000 kilometres of road and over 30,000 structures (principally bridges) in the Australian network. From the table above it can be seen that, of this total road length, some 14 per cent comprises the major rural arterials (including the national highways) and 2 per cent the urban arterials and sub-arterials. The arterials, totalling 16 per cent of all road mileage, carry the bulk (74 per cent) of the nation's road traffic, with the single largest proportion (47 per cent) of the traffic being carried on the urban arterials.

Substantial improvements have been made in road standards. Nevertheless much has yet to be achieved, as the following facts from the 1972 survey indicate. Of the 114,559 kilometres of rural arterials and sub-arterials (14 per cent of the nation's total road length) only 79.452 kilometres (69 per cent) were sealed, and only a minuscule 425 kilometres (1 per cent of rural roads) were dual carriageways.

In urban areas, while the bulk of all the arterials were sealed, only 1,321 kilometres (11 per cent) of the total arterial road distances were dual carriageways. Urban freeway development in Australia, comprising about 71 kilometres in all cities, was far below that of overseas cities of

comparable size, population density, and motor vehicle ownership and usage rates.

## **Future developments**

The two most important new developments in expanding and up-grading Australia's road network, now being discussed by planners are:

- (i) the need to develop a national highways system; and
- (ii) the planning of improved urban roads for both the already developed and the newly-developing urban areas of the nation.

**National highways system.** Although numerous countries have developed national roads systems (e.g. United States of America, Federal Republic of Germany), this idea has received general acceptance only recently in Australia. The fundamental concept is one of identifying, designating and developing a system of arterial roads connecting the capital cities and the principal regions of the nation, and recognising a national interest in road development that goes beyond the local considerations which have largely determined road building activities in the past. Thus, highways are needed to provide for traffic which is long distance in nature, or is export oriented, or which crosses State or major regional boundaries. The benefits of highway development often accrue beyond the confines of any one State. In these circumstances it is evident that there is a role for the national government in the strategic planning, financing and improvement of such roads.

Australian Government participation has been recognised in the **National Roads Act 1974**, in which the Australian Government has taken the full financial responsibility of the development and implementation of a national highways system requiring co-ordinated planning at the national level. Adoption of such a policy is a major new development in the history of roads in Australia, not only because of the magnitude of the national highways task but also because historically the Australian Government had largely left road planning and construction to the States and to local governments.

**Urban roads.** The need to upgrade and expand the nation's urban roads also poses a number of planning problems which hitherto has not been faced by State and local government road authorities in Australia.

At one end of the planning spectrum is the need to cater for and regulate the ever-increasing volumes of vehicular traffic which are causing congestion on the existing arterials; at the other end of the spectrum, but related to the first problem, is the need to meet the increasing demands by citizens for an altered and improved property-access street system which will continue to provide access, yet will improve the amenity of urban areas by reducing and controlling traffic flows in residential shopping and recreational precincts. The planning process should also attempt to make provision for road safety and minimising of pollution.

Common to both these requirements is the need to integrate urban road construction programs with programs for the development of other than private-vehicle modes of transport. On a broader scale, there is the need to integrate transport planning (for roads and other modes) with land use planning in new programs for improved urban and regional development. These considerations plus the high cost of undertaking roadworks in established urban areas, has thrown new emphasis on the need for improved planning methodologies for urban roads. The Australian Government's participation in meeting these aims is reflected in the provision of funds for planning under **the Transport (Planning and Research) Act 1974** and the **Urban Public Transport (Research and Planning) Act 1974**. In addition, under the **Road Grants Act 1974**, the Australian Government requires investigation of road projects to ensure that the impact of road improvements is not excessively detrimental to urban life.

The challenge for the future is to develop improved urban road networks forming part of an overall balanced transport system which will cause minimal environmental and social disruption and receive general community acceptance.

## **AIR TRANSPORT**

### **Department of Transport (Air Transport Group)**

Control of air transport in Australia is exercised by the Department of Transport's Air Transport Group. The Group's jurisdiction covers Australia and areas of the Indian and Pacific Oceans. Year Books Nos. 16, 19 and 38 trace the establishment of air transport control in Australia and the appropriate Acts of Parliament and Regulations under which this control is exercised. The present functions of the Group are shown in Year Book No. 51, pages 578-9, and further details about its operations are given in the annual reports to the Australian Parliament by the Minister for Transport.

### **Regular air services within Australia**

**Interstate services.** The majority of scheduled interstate services with passenger and all-freight aircraft are provided by two airlines only, the private enterprise airline Ansett Airlines of Australia (a division of Ansett Transport Industries (Operations) Pty. Ltd., which is a subsidiary of Ansett Transport Industries Ltd.) and the Australian Government-owned Trans-Australia Airlines. All principal routes are competitive, with both airlines providing equal capacities in accordance with legislation passed by the Australian Parliament. The two principal Acts which establish the legislative basis of this controlled competition are the **Airlines Agreement Act 1952-1972** and the **Airlines Equipment Act 1958**. The Airlines Equipment Act established the machinery for the achievement and maintenance of comparable, but not necessarily identical, aircraft fleets between T.A.A. and Ansett Airlines of Australia, and is designed to prevent the provision of excess aircraft capacity. The Airlines Agreement Act established the basis of control of the two-airline competitive system and extended this machinery until at least 1982.

In addition to purely interstate services, both Ansett Airlines of Australia and Trans-Australia Airlines operate routes to Papua New Guinea under a pool agreement with Air Niugini and non competitive intrastate routes in Australia. The Ansett Airlines of Australia non-competitive routes radiate mainly from Melbourne, while those of Trans-Australia Airlines are located within Queensland.

At 30 June 1973 the Ansett Airlines of Australia fleet included seven Boeing 727s, twelve DC-9s, eleven Friendships, three L188(F)s and two helicopters. At the same date Trans-Australia Airlines operated a fleet of seven Boeing 727s, twelve DC-9s, thirteen Friendships and six Twin Otter DHC-6.

**Intrastate services.** In addition to the intrastate services operated by Ansett Airlines of Australia and Trans-Australia Airlines there are a number of smaller regional airlines operating from Sydney (Ansett Airlines of New South Wales and East-West Airlines), Adelaide (Ansett Airlines of South Australia), Perth (MacRobertson Miller Airlines), and Alice Springs (Connair). With the exception of Connair, which provides regular service to outback homesteads and communities, all of these are concerned primarily with traffic moving to and from the respective capital city. With the exception of the independently owned East-West Airlines and Connair, all regional airlines are divisions of Ansett Transport Industries (Operations) Pty. Ltd. The larger aircraft used by these regional airlines are Fellowships, Friendships and Convairs. Connair uses DC3s, Herons and smaller aircraft types.

**Commuter services.** These are not airline services but regular flights by charter firms with small single and twin-engined aircraft operating to fixed and published timetables. They provide regular air links between many centres, towns and country areas which are either not served by the major airlines or have no direct air service with their capital or nearest major provincial city. The first commuter service approved was for Opal Air Pty Ltd, of Coober Pedy (S.A.), to operate between Adelaide and the South Australian opal fields. At 30 June 1973 twenty-four charter operators were Operating commuter services in Australia. Details of the operations of these commuter services are excluded from the statistics shown in this section.

### Footnotes

1. This note on the history of road development in Australia was prepared by the Commonwealth Bureau of Roads.
2. Passenger travel is measured by the total distance travelled by persons by car, bus, tram, rail, air and sea. Freight transport is measured by the total distance each unit weight of freight is carried by all modes of transport.
3. Clark, C.M.H.; A History of Australia: Vol. 1, Melbourne University Press, Melbourne 1962. page 269.
4. The Mother Colony of the Australians, ed. Frank Hutchinson; Department of Public Works, Sydney. 1896, page 290.
5. Macadamised roads had a surface of durable stone, broken up and rolled tightly.
6. These classifications vary between the States and do not accord with the Australian Government's functional classes of road (which are defined further on).

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